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***Energy Efficiency and Renewable Energy Clearinghouse (EREC)***

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May 2001

"Our state energy office is not focusing just on our own community in promoting energy efficiency and the wise use of resources," Carr explains. "Developing countries are even less able to afford to waste energy and money than we are. In addition, energy usage impacts all of us and the economic and environmental benefits of saving energy are not restricted to Hawaii, but benefit the entire global community."

**Buildings for the 21st Century**

Buildings that are more energy efficient, comfortable, and affordable...that's the goal of DOE's Office of Building Technology, State and Community Programs (BTS). To accelerate the development and wide application of energy efficiency measures, BTS:

- Conducts R&D on technologies and concepts for energy efficiency, working closely with the building industry and with manufacturers of materials, equipment and appliances
- Promotes energy/money saving opportunities to both builders and buyers of homes and commercial buildings
- Works with State and local regulatory groups to improve building codes, appliance standards and guidelines for efficient energy use
- Provides support and grants to States and communities for deployment of energy-efficient technologies and practices

**Case in Point**

# HIGH PERFORMANCE CONTRACTING: HAWAII COUNTY BUILDING RETROFIT

The Rebuild Hawaii Island community partnership works in cooperation with Rebuild Hawaii State and the county island partnerships of Kauai and Maui, as well as various civic, business and environmental groups to implement energy-efficiency projects under the Rebuild America program. When it first joined the program in December 1996, the partnership's initial goal was to cut energy consumption in county buildings by 25 percent in 2000.

This "25 percent solution" would save county taxpayers nearly $250,000 annually through various energy-efficiency measures in the inventory of county-owned buildings. It was envisaged that performance contracting would be a major tool in achieving this goal.

The Rebuild Hawaii Island partnership has successfully completed part of its energy-efficiency retrofit projects in county buildings and expects to complete the entire project, including retrofits to county water supply facilities and other county-owned and private facilities, by 2002. A total of 500,000 square feet of building space has been targeted, with anticipated cost savings of $250,000 annually for buildings and another $750,000 annually for water supply facilities. The high-profile kick-off project to retrofit the Hawaii County Building in Hilo, was very successful, demonstrating significant energy and monetary savings for the County of Hawaii. As a Rebuild America project, the Hawaii County Building was a "case-in-point" of what a successful energy efficiency retrofit project can mean to a community.

## PILOT PROJECT SUCCEEDS WITH FLYING COLORS

Phase I of the Rebuild Hawaii Island (the "Big Island") Action Plan involved a pilot retrofit project of the Hawaii County Building, the seat of local government in Hilo, through a performance contract with Honeywell, Inc., financed by a tax-exempt municipal lease. Performance contracting lets future energy savings pay for the entire cost of commercial energy-efficiency projects.

Raymond Carr, Energy Coordinator for the Department of Research and Development for the County of Hawaii and point of contact for the Rebuild Hawaii Island partnership, says, "There are significant advantages to using performance contracting. In our case, it addressed the intractable problem of financing large retrofit projects in a very difficult economic environment. The energy service company (ESCo) assumes many of the project risks, as well as equipment maintenance responsibilities over the term of the contract–in our case, ten years. With certain projects, performance contracting can also utilize favorable tax-exempt financing. And lastly, those of us involved in the project gain experience and expertise which we can apply to future projects."

Municipal leasing allows city, county or state governments to borrow money at rates considerably lower than what an ESCo may be able to offer through regular commercial loans. With this type of leasing, the lender receives a federal tax exemption on certain interest income. For the Hawaii County Building retrofit, the municipal lease, at a rate of 5.9 percent, financed $480,000 over a 10-year period. The local utility's demand-side-management (DSM) incentive payment of $15,083 helped offset costs as well.

A consultant was hired to help guide the process in 1994; an RFP was issued in November 1995; and the ESCo was selected in June 1996. Construction on the 68,000 square-foot Hawaii County Building started in January 1997 and was completed three months later.

The retrofits included de-lamping 1,000 fluorescent fixtures from 3-lamp to 2-lamp; installing high-efficiency T-8 lamps and electronic ballasts; replacing two 100-ton R-11 centrifugal air-conditioning chillers with two 90-ton energy-efficient R-22 screw chillers; and installing a basic energy management system. Air-conditioned space in the building totaled 45,000 square feet, or 4,200 square meters.

### THE NUMBERS TELL THE STORY

For the baseline year 1995-96, electricity consumption at the Hawaii County Building totaled 1,109,780 kWh. In the first post-retrofit year, 1997-98, consumption dropped to 756,800 kWh, an impressive saving of 32 percent. The annual electricity cost at the County Building for the baseline year 1995-96 was $182,321. The bill for the first year post-retrofit year was $144,039, an apparent saving of $38,282, which is only 21 percent of the pre-retrofit annual cost. However, the County Building retrofit was carried out against a backdrop of rapidly escalating electricity rates on the Big Island. In 1995-96, the average rate for the County Building was $0.166/kWh. The corresponding rate for 1997-98 was $0.190/kWh. After adjusting the baseline year data for this and other variables tracked by the energy accounting software, adjusted electricity cost savings totaled $67,409, appreciably more than the annual municipal lease payment of $62,290. The table below shows energy and adjusted cost savings for the first three post-retrofit years.

*Rebuild Hawaii's Jennifer Webb enjoys the comfortable, attractive interior lobby of the Hawaii County Building.*

| Year | Electricity Usage KWh | Electricity Savings kWh | Cost Savings $ |
|---|---|---|---|
| Baseline 7/95-6/96 | 1,109,780 | -- | -- |
| 4/97-3/98 | 756,800 | 352,980 | 67,409 |
| 4/98-3/99 | 755,520 | 354,260 | 62,322 |
| 4/99-3/00 | 755,680 | 354,100 | 64,269 |
| **Cumulative** | | | |
| 4/97-3/00 | 2,268,000 | 1,061,340 | 194,000 |

### BUILDING ON SUCCESS

Based on the highly successful pilot project, Carr and the Rebuild Hawaii Island partnership plan to retrofit the remaining inventory of County owned buildings in Phase II of the overall program. A total of 200 utility accounts and 500,000 square feet of buildings are included with a combined $1.75 million in annual electricity costs. The project will require an investment of approximately $2 million.

Completion of a $400,000 investment in lighting retrofits to 27 county fire and police sub-stations in February 2000; has yielded annual savings of $50,000. By July 2001, completed retrofits of the County's two main public safety buildings, an investment of $1.4 million projected to result in electricity savings of $140,000 per year. Following this stage, the Island partnership aims to retrofit the large number of smaller county facilities scattered around the Big Island.

The partnership is presently working with the Hawaii County Department of Water Supply to implement efficiency measures aimed at significantly reducing their annual $8 million electricity bill. This is Phase III of the overall retrofit program and, at this time, capital costs have not yet been developed.

An important partner in the Rebuild Hawaii Island program has been the Hawaii Electric Light Company–(HELCO). HELCO has active DSM programs for residential and commercial/industrial customers that provide financial incentives, valuable local publicity and project technical assistance. Incentive payments from HELCO's DSM program will be used to help fund these retrofits.

### LESSONS LEARNED

Carr says he's learned some important lessons from his community partnership's retrofit projects. One area of special interest to him is that of measurement and verification of energy savings. "The owner and the ESCo need to arrive at a fair and equitable solution for the evaluation of energy savings, especially in regard to the savings guarantee for the project," Carr states. "One can select from a number of ways to evaluate savings. Each has its own merits and drawbacks. The more demanding the M&V plan, the more it will cost the project. Correspondingly, this can affect the total scope of work that can be achieved."


*Ray Carr standing in front of the Hawaii County Building.*

Modern energy accounting software is very helpful for estimating savings in energy usage. However, depending on your utility rate structures, it can be complicated translating these savings to dollar savings. "Be sure to evaluate ongoing savings at the marginal utility rates that do not include embedded costs, such as meter charges, that have to be paid regardless of efficiency improvements," notes Carr. In the county's current retrofit project, annual savings will be determined by multiplying kWh saved by the same marginal rates used by the ESCo in the energy study to calculate guaranteed savings from the project.

### EXTENDING SUCCESS ACROSS THE PACIFIC

Carr hopes to extend his success in retrofits to Asian countries across the Pacific–and even beyond.